



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/577,011	04/25/2006	Masaaki Takegami	4633-0168PUS1	6000
2292 7590 03/23/2009 BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747				
EXAMINER TOOM, IYAD F				
ART UNIT 3744		PAPER NUMBER		
NOTIFICATION DATE 03/23/2009		DELIVERY MODE ELECTRONIC		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary**Application No.**

10/577,011

Applicant(s)

TAKEGAMI ET AL.

Examiner

IYAD TOOM

Art Unit

3744

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 September 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on 25 April 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-8508)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____
- Paper No(s)/Mail Date See Continuation Sheet

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :9/18/2007, 4/11/2007, 4/25/2006..

DETAILED ACTION***Claim Objections***

Claim 9 is objected to because of the following informalities: claim 9 recites in lines 10-11 "the defrosting start judging means", correction to –the defrosting end judging means- is recommended. Appropriate correction is required.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1, 6 and 7 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-3 of U.S. Patent No. 7,305,846 B2 by Ueno et al. Although the conflicting claims are not identical,

Art Unit: 3744

they are not patentably distinct from each other because Ueno discloses in claims 1-3 all the limitations of claims 1, 6 and 7 of the instant application.

In regard to claim 1, Ueno discloses in claim 1, a refrigerating apparatus comprising a refrigerant circuit 20 in which a first cooling circuit 110 including a first heat exchanger 111 for cooling inside and a second cooling circuit 30 for cooling inside and a sub compressor 141 are connected in parallel to a heat source side circuit having 43 a main compressor 41, Ueno further discloses switching between first operation for sending after the refrigerant from the second heat exchanger is compressed in the sub compressor, the refrigerant to a suction side of the main compressor and second operation for circulating after refrigerant from the first heat exchanger is compressed in the sub compressor, the refrigerant to the first heat exchanger through the second heat exchanger, and the refrigerant circuit performs the second operation during defrosting operation for defrosting the second heat exchanger, However, Ueno discloses a switching mechanism not three way switching mechanism, but it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Ueno's switching mechanism to a three way mechanism to efficiently control the normal and defrosting operations of the refrigeration apparatus.

In regard to claim 6, Ueno discloses in claim 2, that the second cooling circuit 30 includes an expansion valve 132 variable in opening and the refrigerating apparatus further comprising:

Control means 201 for keeping the expansion valve being opened fully, However Ueno discloses that the valve is opened during defrost operation while the instant application specifies that the valve is opened in the second operation.

In regard to claim 7, Ueno discloses in claim 3, that the refrigerant bypassing the sub compressor flows during stop of the sub compressor and the refrigerating apparatus further comprising:

Control means for stopping, in transition from the second operation to the first operation in termination of defrosting operation, the sub compressor for a predetermined time period and allowing the sub compressor to start operating thereafter, Ueno further discloses a bypass path but does not specify that the bypass is a second bypass path but it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Ueno to include a second bypass path in order to further enhance the refrigerant flow during defrosting operation.

Art Unit: 3744

Claim Rejections - 35 USC § 102

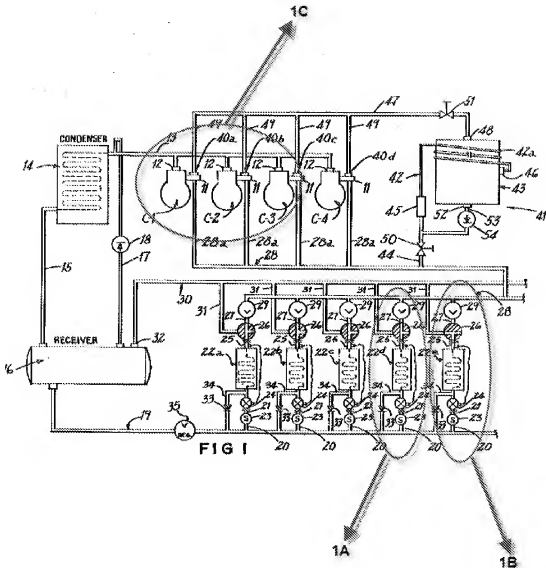
The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this

Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 is rejected under 35 U.S.C. 102(b) as being anticipated by
Friedman, US Patent No. 4,184,341.



In regard to claim 1, Friedman discloses a refrigerating apparatus, comprising as in fig. 1, a refrigerant circuit in which a first cooling circuit 1A having a first heat exchanger 22d for cooling inside and a second cooling circuit 1B having a

Art Unit: 3744

second heat exchanger 22e for cooling inside and a sub compressor C-4 are connected in parallel to a heat source side circuit 1C having a main compressor C-3, wherein the refrigerant circuit includes three-way switching mechanisms 26 for switching between first operation for sending, after refrigerant from the second heat exchanger 22e is compressed in the sub compressor, the refrigerant to a suction side of the main compressor, fig. 1 discloses a three way mechanism 26 in which the refrigerant flows from heat exchanger 22e to a line 28 to sub compressor C-4 suction side 11 and then compressed, the refrigerant further flows from the evaporator 22e through line 28 to the suction side of main compressor C-3, and second operation for circulating, after refrigerant from the first heat exchanger 22d is compressed in the sub compressor C-4, the refrigerant to the first heat exchanger through the second heat exchanger 22e, and the refrigerant circuit performs the second operation during defrosting operation for defrosting the second heat exchanger, fig. 1 further discloses that in a defrost operation which is disclosed in col. 3, line 47-col. 4, line 28 that the refrigerant in the sub compressor C-4 is discharged through discharge line 13 to a common defrost header 30 to the second heat exchanger 22e and when the second heat exchanger 22e is finished with defrosting, the refrigerant will flow to a liquid header 19 and that refrigerant will flow to either heat exchanger 22a, 22b, 22c or 22d based on the refrigeration needs of those heat exchangers.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Friedman and further in view of Cantley, US Patent No. 4,439,997.

In regard to claim 2, Friedman discloses in fig. 1 and col. 3, line 19 that the three-way switching mechanisms are a first three-way switching mechanism 26 for allowing the second heat exchanger 22e to communicate with a suction side 11 of the sub compressor C-4 in the first operation, fig.1 discloses that in normal operation the discharge of heat exchanger 22e flows through line 28 to the suction 11 of the sub compressor C-4 and allowing the second heat exchanger 22e to communicate with a discharge side 13 of the sub compressor C-4 in the second operation, fig. 1 further discloses in defrost operation, the discharge of sub compressor C-4 will flow through line 13 to defrost header 30 to the second heat exchanger 22e, Friedman discloses a plurality of second three way switching mechanism 26 located on the discharge side of each heat exchanger 22a, 22b, 22c and 22d and further discloses in 1 that in defrost operation the

suction 11 of booster compressor C-4 is in communication with suction side 11 of the main compressor C-3 but does not disclose that the second three-way switching mechanism for allowing the suction side of the main compressor to communicate with the discharge side of the sub compressor in the first operation and allowing the suction side of the main compressor to communicate with the suction side of the sub compressor in the second operation. Cantley discloses in fig. 3 a sub compressor 84 in which its discharge line 85 is connected to the suction of main compressor 86 and it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Friedman's apparatus to connect the suction side of the main compressor C-3 to the discharge side 13 of the suction compressor C-4 as taught by cantley through a three way switching mechanism or the like in order to obtain variable capacity compressors with variable discharge pressures in order to adapt to the change of thermal loads in the system.

In regard to claim 3, Friedman discloses in col. 3, line 19 having a plurality of three way valves 26 which function as three way mechanisms.

Claims 4 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Friedman.

In regard to claim 4, Friedman discloses in fig. 1 that the three way switching mechanisms 26 is composed of a main pipe 31 and two branch pipes 27 and 25

Art Unit: 3744

branching in two ways from the main pipe 31, Friedman discloses a first valve 29 located in the branch pipe 27 which is an on-off valve, however, Friedman does not disclose a second on-off valve and one of which is closed when the other is opened but it would have been obvious to a person of ordinary skill in the art at the time of the invention to provide one more valves in which one is closed and the other is open in the branch lines in order to control the flow of the refrigerant and to isolate different parts of the system in case of maintenance operations such as leaks and preventive maintenance and for easier control and upkeep of the system and to program the system to be able to control the opening and closing of valves to achieve the desired operations.

In regard to claim 5, Friedman discloses in fig. 1 that the second cooling circuit 1B includes a thermostatic expansion valve 24 which detects temperature of the refrigerant flowing out from the second heat exchanger 22e for adjusting opening of its own and a first bypass passage 34 in which refrigerant bypassing the thermostatic expansion valve 24 flows only in the second operation, fig. 1 shows that in defrost operation the bypass line 34 handles the refrigerant and a solenoid valve 23 prevents the flow through the line in which the thermostatic expansion valve 24 is located.

In regard to claim to claim 6, Friedman discloses a check valve 33 in the second cooling circuit 1B for allowing the flow out of the second heat exchanger 22e in

Art Unit: 3744

the defrost operation but does not disclose a variable opening expansion valve or control means for keeping the expansion valve being opened fully in the second operation but it would have been an obvious mechanical expedient to either substitute the check valve of Friedman with an expansion valve in the second cooling circuit 1B that is controlled to be fully opened so as to make sure that the refrigerant flows out of the heat exchanger 22e in the second operation and also to control the expansion valve opening to adapt to the refrigerant flow in the heat exchanger during second operation which reduces pressure loss in the heat exchanger and also reduces compressors energy consumption.

In regard to claim 7, Friedman discloses that the refrigerant circuit includes a second bypass passage 28a in which refrigerant bypassing the sub compressor C-4 flows during stop of the sub compressor 11, this passage 28a allows the refrigerant from heat exchanger 22e to bypass sub compressor C-4 in case the compressor is stopped and flows to the main compressor C-3 suction side 11. Friedman further discloses in col. 6, line 23-col. 7, line 57, control means 40a-40d that control the operation of sub compressor C-4 during defrost operation and after defrost operation, Friedman further discloses in col. 6, lines 40-45 and col. 6, line 23-col. 7, line 57 that the control means 40a-40d control the start of the compressors C-1 to C-4 based on the suction pressure and after the termination of defrost operation sub compressor C-4 compressor will be stopped till an adequate cut-in pressure is obtained and once the cut-in pressure is reached the compressor C-4 starts.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Friedman in view of Cantley and further in view of Starck, US Patent No. 4,671,072.

In regard to claim 8, Friedman does not disclose a defrosting start judging means for allowing the defrosting operation to start by switching the refrigerant circuit from the first operation to the second operation, or that the defrost judging means allowing the defrosting operation to start on the basis of elapsed time after the first operation starts, an amount of frost of the second heat exchanger or inside temperature of equipment in which the second heat exchanger is provided. Starck discloses in the Abstract a sensor for sensing the magnitude of defrost on evaporators, Starck further discloses in col. 4, lines 24-29 that the defrosting starts based on the defrost sensors signals. It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Friedman's apparatus to include a frost sensor as taught by Starck in order to detect the frost buildup within the second heat exchanger 22e and subsequently initiate a defrost cycle to remove the frost buildup which enables the second heat exchanger 22e to maintain it's proper functionality and thermal performance.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Friedman in view of Cantley and further in view of Dube, US Publication No. 2004/0250555.

In regard to claim 9, Friedman does not disclose defrosting end judging means for terminating the defrosting operation by switching the refrigerant circuit from the second operation to the first operation, or that the defrosting start judging means terminating the defrosting operation on the basis of elapsed time after the second operation starts, discharge pressure of the sub compressor, temperature of the refrigerant flowing in the second heat exchanger, or inside temperature of equipment in which the second heat exchanger is provided. Dube discloses in Para. 49, lines 10-18 having a temperature sensor to sense the refrigerant temperature in a respective evaporator 20 in order to terminate the defrosting operation. It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Friedman's apparatus to include a second heat exchanger 22e refrigerant temperature sensor in order to accurately and efficiently control the termination of the defrost operation to save energy and restore the apparatus proper functionality.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to IYAD TOOM whose telephone number is (571)270-7395. The examiner can normally be reached on 7:30-5:00.

Art Unit: 3744

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frantz Jules or Cheryl Tyler can be reached on 571-272-6681 or 571-272-4834. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

3/12/2009

/I. T./

Examiner, Art Unit 3744

/Frantz F. Jules/

Supervisory Patent Examiner, Art Unit 3744

